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EXAMINER	
GRAHAM, ANDREW R	

ART UNIT	PAPER NUMBER
2644	13

DATE MAILED: 06/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/454,027	SINHA ET AL.	
	Examiner	Art Unit	
	Andrew Graham	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-46* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-46* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. **Claims 1-3, 8-9, 13-14, 19-21, 25-27, 32-33, 37-38, and 43-45** are rejected under 35 U.S.C. 103(a) as being unpatentable over Reudink (USPN 4498173)in view of Edler et al (USPN 5511093) . Hereafter, "Edler et al" will be referred to as "Edler".

Reudink discloses a system for improving the reliability in transmission and reception of voice signals over multiple signal paths based on a split channel transmission technique. This technique involves splitting an input signal into two sets of bits, wherein each set of bits is encoded such that each set of bits may be predicted based on the value of the other set of bits (col. 3, lines 4-19 and col. 6, lines 7-11). These two sets of bits, in view of the standard definition of the word "component", read on "the signal including at least a first component and a second component" (col. 3, lines 4-9). Reudink teaches that each set of bits may include one half of the overall number of bits (col. 3, lines 4-9). Figure 2 illustrates

details of the interpolative coder (12), which includes a processor (16). As can be seen, it is this processor (16) that outputs the two output signals, the first number signal and the second number signal (col. 3, lines 11-15). This processor (16) reads on "a processor for generating at least a first representation and a second representation of the signal". With the multiple transmission or output channels (131,132) for the encoded signal, the overall device reads on "Apparatus for communicating a signal over a plurality of communication channels". The internal connections to these leads (131,132) or the inherent transmitter involved with mobile telephony read on "an output device for transmitting the first representation and the second representation through the communication channels" (col. 1, lines 19-22 and col. 3, lines 11-15). Regarding the coding scheme of Reudink, the overall system enables half of the transmitted signal to be used to reproduce the original signal to a fair degree of accuracy, and the reception of both halves of the transmitted signal to be used to reproduce a high quality reproduction of the original signal (col. 2, lines 2-6). This scheme involves encoding the separate sets of bits into a digital number pair code (col. 3, lines 4-9 and 16-32). One example of the encoding is shown in Figure 3, wherein each input level is associated with a unique pair code and a coder output code (col. 3, lines 50-68). The predictor (33) of the receiving part of the system then predicts which number code pair is the most likely to be the initially transmitted code pair based on the most recently received correct number pair (col. 6, lines 7-35). This prediction

relies upon the received number code and the valid corresponding codes outlined by the coding scheme, such as that shown in Figure 3 (col. 6, lines 12-27).

Accordingly, Reudink is not interpreted herein to teach:

- that each transmitted representation contains:
    - o a first information concerning one of either the first or second components
    - o another information for predicting the other of the first or second components based on the first information

Edler discloses another system for predicting the overall audio signal based in part on a received complete half of the original signal. The system of Edler utilizes a predictor to reduce the data in a multi-channel data transmission. The input signal of this system is received along two input lines (21,22) which are input to a computer unit (1) (col. 1, lines 51-56). The data (x(n),y(n)) received along these lines is submitted to a computer unit (3) that determines the optimal prediction coefficients, a_k, and optimal delay, d, which are transmitted to a predictor (5) and delay unit (4), respectively. The delay circuit (4) and predictor (5) apply the delay, d ,and coefficients, a_k, to one half of the input signal x(n) to form a value y(n)' that is subtracted from the other half of the input signal y(n) to form an error prediction signal e(n) (col. 2, lines 11-26). These signals, one half of the input signal x(n), the prediction

coefficients, a_k, the delay, d, and the prediction error, e(n), are routed to another computer unit (6) that transmits the signals (col. 2, lines 27-33, Figure 2). In this transmitted signal, the original half of the input signal, x(n), reads on "first information concerning at least the first component" and the two halves of the signal (x(n),y(n)) read on "the signal including at least a first component and a second component". As discussed above, Reudink discloses an encoding scheme that enables half of the transmitted signal to be used in predicting the value of the overall signal, wherein representations of both halves of the signals are transmitted. Accordingly, the original signal component in the system of Edler, when taken in view of the dual and alternate half teachings of Reudink, reads on "third information concerning at least the second component". The prediction coefficients, a_k, and prediction error signal, e(n), again in view of the multi-channel transmission of Reudink, reads on "second information concerning at least one coefficient for predicting the second component based on the first information" and "fourth information concerning at least one coefficient for predicting the first component based on the third information". The overall, combined transmitted signal reads on "a first representation and a second representation of the signal".

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to use the prediction scheme of Edler to encode the two signal halves of the scheme of Reudink. The

motivation behind such a modification would have been that the prediction information in the scheme of Edler is included with the half of the signal upon which the prediction is based, as opposed to the system of Reudink which is based on a last-look progression that requires a previously received, errorless signal pair and the memory for storing the various successfully received pairs. The system of Reudink also involves a degree of error contained within the number of possible signal pairs of a received signal half, whereas the approach of Edler involves prediction coefficients and a error prediction signal based on the use of the prediction coefficients prior to initial transmission. Encoding two different transmission channels in the style of Reudink would have increased the reliability of receiving the signal beyond that of the single transmission path illustrated in the disclosure of Edler.

Regarding **Claim 2**, the prediction between the input signal parts in the system of Edler is based at least in part on the input channels being part of a stereo audio signal (col. 3, lines 56-67 and col. 4, lines 1-4). This reads on "the signal includes a stereo audio signal".

Regarding **Claim 3**, as noted above in regards to Claim 2, Edler discusses the use of a stereo audio signal with the interchannel prediction (col. 3, lines 56-67). Edler discloses that the embodiments of Figures 2 and 3 illustrate such an interchannel predictor (col. 4, lines 2-4). In view of the stereo audio signal input, the two parts of the input channel (x(n),y(n)) read on "the first component includes a

left channel signal of the stereo audio signal" and "the second component includes a right channel signal" (col.5, lines 39-40).

Regarding **Claim 8**, please refer to the above discussion regarding Claim 1 for the limitations of "a first representation" and "a second representation". Reudink discloses the relevant art of mobile telephony, which inherently involves a receiver for such a signal, and Edler also discloses that the signals may be transmitted via electromagnetic waves to a receiver, both of which read on "a receiver for receiving" (col. 1, lines 19-22 of Reudink and col. 1, lines 66-67 and col. 2, lines 1-4 of Edler). Reudink also discloses the use of a processor (36) that does not use a received signal when an excessive error rate is encountered in the received signal (col. 5, lines 42-53). This processor (36) reconstructs the data based on both or either one of the received signals, which reads on "a processor for selecting use of at least one of the first representation and the second representation to recover the signal" (col. 5, lines 54-68 and col. 6, lines 1-6).

Regarding **Claim 9**, Reudink discloses that a received signal with a detected energy below a predetermined threshold indicates that an excessive error rate is being encountered in the signal (col. 5, lines 31-54). This energy detection is performed by threshold detectors (31_1,31_2) (col. 5, lines 31-39). This error rate detection reads on "the at least one of the first representation and the second

representation is selected based on a measure of corruption of the selected representation".

Regarding **Claim 13**, please refer to the above discussion regarding the similar limitations of Claim 2.

Regarding **Claim 14**, please refer to the above discussion regarding the similar limitations of Claim 3.

Regarding **Claim 19**, please refer to the above discussion regarding the similar limitations of Claims 1 and 8.

Regarding **Claim 20**, please refer to the above discussion regarding the similar limitations of Claim 2.

Regarding **Claim 21**, please refer to the above discussion regarding the similar limitations of Claim 3.

Regarding **Claim 25**, please refer to the above discussion regarding the similar limitations of Claim 1.

Regarding **Claim 26**, please refer to the above discussion regarding the similar limitations of Claim 2.

Regarding **Claim 27**, please refer to the above discussion regarding the similar limitations of Claim 3.

Regarding **Claim 32**, please refer to the above discussion regarding the similar limitations of Claim 8.

Regarding **Claim 33**, please refer to the above discussion regarding the similar limitations of Claim 9.

Regarding **Claim 37**, please refer to the above discussion regarding the similar limitations of Claim 2.

Regarding **Claim 38**, please refer to the above discussion regarding the similar limitations of Claim 3.

Regarding **Claim 43**, please refer to the above discussion regarding the similar limitations of Claims 1 and 8.

Regarding **Claim 44**, please refer to the above discussion regarding the similar limitations of Claim 2.

Regarding **Claim 45**, please refer to the above discussion regarding the similar limitations of Claim 3.

2. **Claims 4-7, 15-18,28-31, and 39-42** are rejected under 35 U.S.C. 103 (a) as being unpatentable over Reudink in view of Edler as applied above, and in further view of Johnston (USPN 5285498).

As detailed above, Reudink discloses a system for enabling a fair reproduction of an original signal to be performed when half of the signal is received, and a highly accurate reproduction of an original signal to be performed when both halves of the signal are received, wherein the halves of the signal are transmitted and received over different signal paths. Edler discloses a system for incorporating

half of a signal along with prediction data for predicting the other half of the overall signal as part of single signal in a transmission path. Edler notes the reference of J.D. Johnston, "Perceptual Transform Coding of Wideband Stereo Signals", which involves the coding of sum and difference signals (col. 1, lines 11-17 and col. 3, lines 44-55).

However, Reudink in view of Edler does not clearly that such an approach is included in the discussed transmission scheme, or alternately:

- that the first information concerns a combination of the first component and the second component

However, the coding of sum and difference channels, or M/S or S/D coding, is substantially well known in the art. Johnston discloses a coding scheme that receives a left and right channel audio signal and dynamically switches between left/right (L/R) and sum/difference (S/D) coding modes (col. 3, lines 25-37). In the S/D mode, the left signal is replaced by S=(L+R)/2 and the right signal is replaced by S=(L-R)/2 (col. 6, lines 60-66 and col. 18, lines 59-65). The selection of these coding schemes is based on the monophonic thresholds between the left and right signals, wherein if the difference between the two signals is less than a predefined value, such as 2 dB, then the S/D mode is chosen (col. 21, lines 15-35). The use of this S/D coding mode reads on "the first information concerns a combination of the first component and the second component".

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to include the alternate S/D coding mode as part of the encoding of the multiple signal parts of the system of Reudink in view of Edler. The motivation behind such a modification would have been that, as disclosed by Johnston, the S/D coding scheme accounts for masking level differences (MLD) in the left and right signals, which relates to the masking of noise in the two channels (col. 19, lines 12-66). The S/D coding prevents the noise from being unmasked, or perceived, in the reproduced signals.

Regarding **Claim 5**, the selection of the L/R mode and S/D mode is adaptive in view of both time and frequency of the involved signal, which reads on "the combination of the first component and second component is adaptively determined" (col. 21, lines 40-46 of Johnston).

Regarding **Claim 6**, please refer to the above discussion regarding Claims 1 and 4, noting the dual encoding discussed in regards to the teachings of Reudink.

Regarding **Claim 7**, please refer to the above discussion regarding Claims 1 and 5, noting the dual encoding discussed in regards to the teachings of Reudink.

Regarding **Claim 15**, please refer to the above discussion regarding the similar limitations of Claim 4.

Regarding **Claim 16**, please refer to the above discussion regarding the similar limitations of Claim 5.

Regarding **Claim 17**, please refer to the above discussion regarding the similar limitations of Claim 6.

Regarding **Claim 18**, please refer to the above discussion regarding the similar limitations of Claim 7.

Regarding **Claim 28**, please refer to the above discussion regarding the similar limitations of Claim 4.

Regarding **Claim 29**, please refer to the above discussion regarding the similar limitations of Claim 5.

Regarding **Claim 30**, please refer to the above discussion regarding the similar limitations of Claim 6.

Regarding **Claim 31**, please refer to the above discussion regarding the similar limitations of Claim 7.

Regarding **Claim 39**, please refer to the above discussion regarding the similar limitations of Claim 4.

Regarding **Claim 40**, please refer to the above discussion regarding the similar limitations of Claim 5.

Regarding **Claim 41**, please refer to the above discussion regarding the similar limitations of Claim 6.

Regarding **Claim 42**, please refer to the above discussion regarding the similar limitations of Claim 7.

3. **Claims 10-12 and 34-36** are rejected under 35 U.S.C. 103(a) as being unpatentable over Reudink in view of Edler as applied above, and further in view of Mallinckrodt (USPN 5832379).

As detailed above, Reudink discloses a system for enabling a fair reproduction of an original signal to be performed when half of a signal is received, and a highly accurate reproduction of an original signal to be performed when both halves of a signal are received, wherein the halves of the signal are transmitted and received over different signal paths. Edler discloses a system for incorporating half of a signal along with prediction data for predicting the other half of the overall signal as part of single signal in a transmission path.

While the system of Reudink discloses that the error rate is involved with the selection of the signals used for reconstructing the original signal, Reudink in view of Edler do not specify:

- that the first and second representations of the original signal are encoded in accordance with a forward error correction coding technique

Mallinckrodt discloses a system for determining and designating preferred communication connections between a receiver and a plurality of input signal nodes. One of the specific features of the system of Mallinckrodt is the monitoring and compensation for the communication signal based on the bit error rate of the received data (col. 14, lines 28-40). According to Mallinckrodt, static bit error rates can directly be determined unacceptable and variable bit error rates can be compared against an acceptable threshold value (col. 14, lines 35-38). Figure 7 of Mallinckrodt shows an embodiment of the transceiver of the system that includes forward error encoders (114,156) for each of the two shown sources of audio input (col. 13, lines 1-28). This reads on "the first representation and the second representation are encoded in accordance with a forward error coding technique".

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to include the forward error decoding and signal quality monitoring and compensation system as taught by Mallinckrodt in the decoder component of the system of Reudink in view of Edler. The motivation behind such a modification would have been that forward error coding would have enabled a limited degree of error correction to be performed on the bits that are received. The system of Reudink discloses the occurrence of a signal with an excessive error rate, which results in the exclusion of the signal, but not that the errors of this signal may be corrected. The forward error correction specifically includes code in the transmitted signal to

indicate the occurrence of errors, as opposed to the system of Reudink, which relies upon the detected energy in the signal.

Regarding **Claim 11**, the system of Mallinckrodt uses the bit rate error, as discussed previously in regards to Claim 10, to determine the amount of compensation required for the desired signal quality (col. 14, lines 28-40). This reads on "a count of detection of errors in the selected representation, in accordance with the forward error correction coding technique". Again, Reudink discloses the exclusion of a signal based on an excessive error rate (col. 5, lines 47-53).

Regarding **Claim 12**, Mallinckrodt also states that the signal quality is based on the noise and interference detected in the signal (col. 14, lines 38-40). The signal quality in regards to interference is compared to a minimal acceptable grade of service (col. 15, lines 62-67 and col. 16, lines 1-12). Mallinckrodt discusses that communication channels that can be used can be integrated satellite and ground nodes, which reads on (col. 7, lines 3-7). The calculation of a nominal signal level under the average condition of interference, as taught by Mallinckrodt, taken in view of the knowledge of one of ordinary skill in the art, is considered to read on "the measure being a function of the signal-to-interference ratio afforded by the communication channel from which the selected representation is received". A S/I ratio is known to those of ordinary skill in the art to provide an indication of an acceptable signal performance with minimal power consumption. The satellite and ground nodes of Mallinckrodt, along with the teachings discussed above of multi-path

transmission of Reudink, are considered to read on "received from a plurality of communication channels".

Regarding **Claim 34**, please refer to the above discussion regarding the similar limitations of Claim 10.

Regarding **Claim 35**, please refer to the above discussion regarding the similar limitations of Claim 11.

Regarding **Claim 36**, please refer to the above discussion regarding the similar limitations of Claim 12.

4. **Claims 22-24 and 46** are rejected under 35 U.S.C. 103(a) as being unpatentable over Reudink in view of Edler as applied above, and further in view of applicant's admitted prior art.

As detailed above, Reudink discloses a system for enabling a fair reproduction of an original signal to be performed when half of a signal is received, and a highly accurate reproduction of an original signal to be performed when both halves of a signal are received, wherein the halves of the signal are transmitted and received over different signal paths. Edler discloses a system for incorporating half of a signal along with prediction data for predicting the other half of the overall signal as part of single signal in a transmission path.

Yet, Reudink in view of Edler does not specify:

- that the communication channels are simultaneously available for transmitting the two representations of the original input signal

In the applicant's disclosure, the applicant discloses that in many prior art, such as Digital Audio Broadcasting (DAB) systems, "it is possible to transmit audio signals over multiple alternative channels, which are simultaneously available for signal transmission" (page 1, lines 30-32 and page 2, line 1). This reads on "the communication channels are simultaneously available for transmitting the first representation and the second representation".

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to transmit the encoded signals of Edler over simultaneously available transmission channels as described in the admitted prior art. Such a modification would have been desirable because split, simultaneous transmissions would have enabled concurrent and continuous redundant signal reconstruction to take place.

Regarding **Claim 23**, the admitted prior art discloses that terrestrial as well as satellite digital audio broadcast systems have already been proposed (page 1, lines 10-12). This reads on "the communication channels include satellite links".

Regarding **Claim 24**, the admitted prior art, again, discloses that terrestrial as well as satellite digital audio broadcast systems have already been proposed, along with the concept of transmitting multiple signals over multiple channels (page 1, lines 10-12 and page 1, lines

30-32 and page 2, line 1). Reudink also discloses that the multiple transmission of a signal is a technique known in the prior art for increasing reliability of the recovered signal (col. 1, lines 22-25). These teachings, in view of the improved error correction and signal reliability afforded through the redundancy, read on "a third representation of the signal is transmitted through a selected one of the communication channels". The applicant's admitted art also discloses that terrestrial digital audio broadcast systems are known in the art (page 1, lines 10-12). A terrestrial link is thus a possibility for part of the third transmission channel, and the desirability of such a channel, in view of the satellite transmission systems, is that it does not face the problems of shared bandwidth limitations or atmospheric conditions.

Regarding **Claim 46**, please refer to the like teachings of Claim 22.

Response to Arguments

Applicant's arguments with respect to claims 1-46 have been considered but are moot in view of the new ground(s) of rejection. Because of these new grounds of rejection, the prosecution of the present application has been re-opened, and the current rejection is non-final.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Graham whose telephone number is 703-308-6729. The examiner can normally be reached on Monday-Friday, 8:30 AM to 5:00 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Isen can be reached on (703)305-4386. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AG
Andrew Graham
Examiner
A.U. 2644

ag
June 1, 2004

MINSUN OH HARVEY
PRIMARY EXAMINER